It is needless to say that no spectrum was observed. These facts appear to be utterly irreconcilable with the conclusion drawn by Messrs. Young and Forbes.

ALBERT A. MICHELSON

Schluchsee, Prussia, August 28

Salmon in Preserved Rivers

HAVING resided for some time lately near one of our salmon rivers which is at present preserved by a club, I have at different times had conversations with men who knew it before its so-called preservation. They all say that when they were allowed to fish when and how they pleased, the supply of fish was much better in regard both to size and quantity. They account for it in the following manner:—Firstly, when the river was free, the people living near used to make spawning-beds for the fish, by placing large stones across the river and throwing gravel where deficient, and where gravel was naturally they used to loosen it with forks and remove the large stones. Secondly, they used to watch the fish at spawning time, and catch and kill all very large fish, say about 16 to 30 lbs. weight, after they had partially or wholly finished spawning, as they say the large fish destroy the salmon fry. Neither this nor the formation of spawning-beds is done at present. Would the above reasons account for the diminution in the size and number of salmon caught in our rivers? The diminution, in the river I speak of, cannot be accounted for by pollution, as the number of houses near enough to send their drainage into the river is too small to affect it, and as the river has a very quick fall and rocky bed, it is subject to such very rapid rises and falls in quantity of water that would prevent any settlement of noxious sediment. F. C. S.

New Seismometer

IN NATURE, vol. xxiv. p. 113, there is a notice of a new seismometer which has several advantages claimed for it. Might I suggest what seems an obvious and important improvement? As a rule pendulums cannot record vertical or oblique motions, and yet these are often the most necessary and valuable to record. 1. To do this, and yet as easily allow of lateral registration, I would say, support a heavy (leaden) ball of some 100 lbs. by a 30 or 40 feet spiral or rubber spring of suitable strength. It will be found that a very considerable amount of vertical play can take place, especially vertical effort, ere the ball can be affected, and that lateral play of the support will produce very little effect indeed, unless, as is most unlikely, the motion is prolonged and is *continuous* in one direction. 2. Around the sphere, and at a very short distance from its surface, radial rods actuated like the key-plugs of a cornet are supported, say at every 30° all over the surface, contact with any one of which will electrically record *time*, and the pencil attached to the plunger record distance of stroke on revolving paper attached to plunger-tube.

Asam, July 6 S. E. PEAL

THE BRITISH ASSOCIATION

THE actual number of persons who attended the York Meeting of the British Association, as announced at the last meeting of the General Committee, was 2556; divided between 272 old life-members, 27 new life-members, 312 old annual members, 175 new annual members, 1232 associates, 514 ladies, and 24 foreigners. The seven previous occasions on which this number has been exceeded were:—Newcastle-on-Tyne, 1863 (3335); Manchester, 1861 (3138); Liverpool, 1870 (2878); Bath, 1864 (2802); Glasgow, 1876 (2774); Dublin, 1878 (2578); Aberdeen, 1859 (2564). The number fell below 1000 at Cambridge, Plymouth, Southampton, Ipswich, Hull, and Swansea. 1280*l.* were paid out by the Council for scientific purposes after the last meeting, a larger sum than on any occasion since 1873; while between 1873 and 1861 that sum was always exceeded, and at Norwich, in 1868, it amounted to 1940*l.*

The following foreigners were present at the meeting:—Professrs Barker of Pennsylvania; Bergeron, Paris; Bojanowski; Carbonnelle, Brussels; Chemin, Paris; Craig, Johns Hopkins University, U.S.; Dohrn, Naples; Eads, St. Louis, U.S.; Gariel, Paris; Dr. Asa Gray, Harvard University; Halphen, Paris; Dr. Edwin Hall, Baltimore, U.S.; Hubrecht, Leyden; Prof. W. W. Johnson, Annapolis, U.S.; Prof. O. C. Marsh, Yale College; Moser, Berlin; Prof. H. A. Rowland, Baltimore; Stephanos, Paris; Sturm, Münster, Westphalia; Prof. H. M. Whitney, Beloit College, Wisconsin, U.S.A.

We ought to have stated in our report of the doings of the Association in our last number, that Prof. Huxley's lecture on Palæontology, which we gave in the same number, was delivered on the evening of Friday the 9th.

Nearly 350 papers or reports were read before the several sections. Of these the Physical and Mathematical Section received 89; the Chemical Section 49; Geology 59; Biology 79; Geography 16; Economic Science and Statistics 26; and Mechanical Science 29. Of the papers in Section A 23 related to Electricity; 21 were Mathematical; Optics claimed 12; Meteorology 11; Astronomy and Physical Geography 12; Heat 5; and miscellaneous physical subjects 5. Of course prominent subjects of interest were electric lighting, electric measurements, and Faure's cells. Such subjects were thoroughly ventilated by discussions both in Section and Committee, and more intimately during the thousand and one opportunities for interchange of ideas which occurred in the afternoon and evening. Again, the storage of energy, the nature of meteoric dust, the existence of intra-Mercurial planets, the lunar disturbance of gravity, the nature of colours, and the contact theory were each severally discussed. Among the 49 Chemical papers several theoretical matters were introduced—specially the atomic theory, chemical nomenclature, vapour densities, molecular weights, Mendeleeff's law, and molecular attraction; processes of analysis and technical operations were described, and new experiments were explained. Of course a good deal of the geological work bore reference to Yorkshire, especially to the evidences of glacial action which it presents. The geological papers were of a very general and interesting character, and embraced every branch of the subject, from the vulcanology of Japan to the minerals found at Laurium, and from the Cheshire salt beds to the evolution of the Plesiosaurus. Section D furnished a larger number of papers than any other Section except A, but we must bear in mind that it really consists of three sub-sections, devoted respectively to Zoology and Botany, Anatomy and Physiology, and to Anthropology. The latter subject has developed extraordinarily, more than half the papers contributed to the Section were read before this Sub-Section. The report of the Anthropometric Committee, which evoked a good deal of discussion, was read in the Section of Economic Science and Statistics. In this section Mr. Grant Duff delivered a very able address, which was warmly received. A tendency to introduce matter which has a political bearing and which may be discussed from a political standpoint is sometimes apparent in this section, and should be carefully guarded against by the Committee. The Mechanical Section furnished some important reports on patent laws, wind pressure, tides in the English Channel, and the steering of screw steamers. Here also were papers on the different forms of electric lamp, the electrical transmission of force, and the illumination of lighthouses.

Thus it will be seen that all the prominent subjects of science have received their share of attention, and at the hands of one or other of the sections have been either expanded or discussed. The interchange of ideas has been incessantly going on, and many men have become acquainted who might otherwise have remained unknown to each other for years. Some 500 scientific men have been gathered together from various parts of the British Islands; and some 2000 persons have been brought face to face with the burning scientific questions of the day, and have had new interests awakened, or old knowledge resuscitated. There can be little doubt as to the

expediency of continuing the work of the Association, if it keep at all near to the standard of the York meeting. The German Society, founded nine years before our Association, and its prototype, still continues to meet annually; and scientific congresses are becoming more and more general every year in Europe.

Canada has been proposed as the place of meeting for 1885. The difficulties of time and place and expense are far less formidable than they appear at the outset. Great facilities would be put in our way by steamboat companies; and, once arrived, the Colony would receive us with open arms. Again, the Americans wish us to join their Association on some convenient occasion, and *àpropos* of this a practical American observed a few days since, "From the moment you set foot on American soil to the moment of departure, you should not put down a cent." One other fact remains to be noticed in regard to the York meeting. *Thirty-four* local societies and institutions were represented at the meeting by forty-nine delegates; and the Council have under consideration the conditions under which these delegates were present, and their object in attending. Cannot the Association do something for them? Cannot some organisation be introduced to influence the local societies through the Association, and cannot a committee of delegates be appointed to discuss matters connected with their respective institutions?

REPORTS

Report of the Committee, consisting of Dr. J. H. Gladstone, Dr. W. R. E. Hodgkinson, Mr. W. Carleton Williams, and Dr. P. P. Bedson (secretary), appointed for the purpose of investigating the Method of Determining the Specific Refraction of Solids from their Solutions.—Mr. P. P. Bedson, D.Sc., read the Report, and stated that the object of this report was to submit to further examination the method proposed some years ago by Messrs. Gladstone and Dale. According to this method the specific refraction of a solid may be deduced from that of a solution containing it, provided the specific refraction of the solvent is known, as also that of the solution and the composition of the solution. The experiments, of which an account is given in the report, appear to confirm this statement of the above-mentioned authors. The first case examined was that of liquid phenol. Its specific refraction for a ray of light of infinite wave-length was determined at 40° and 45°. The values obtained for the specific refraction of liquid phenol at 40° and 45°, viz., ·4850 and ·4848, are closely approximate to that obtained by Brühl (*Journ.* Chem. Soc., abst., 1880, p. 782) for phenol at 20°, viz., ·4862. Further, these results agree very well with the mean of the specific refractions obtained from the alcoholic and acetic acids solutions. The specific refraction of rock-salt in the solid state has also been determined and compared, with its specific refraction as deduced from its aqueous solutions; and it was found that the specific refraction obtained from the aqueous solution is substantially the same as that obtained from a prism of rock-salt. Further, the specific refractions of fused borax and boric acid have been determined, and in these cases also the specific refraction obtained from their aqueous solutions was found to be approximately the same as the specific refractions of fused borax and boric acid. The indices of fused borax and of fused boric acid were determined by means of prisms of these materials, which were cast in a mould of silver plates and afterwards ground and polished.

Report of Committee on Meteoric Dust, by Prof. Schuster.—This Committee was appointed for the double purpose of examining the observations hitherto recorded on the subject of meteoric dust and of discussing the possibility of future more systematic investigations. With regard to the first point we note that in a paper presented to the Royal Astronomical Society in 1879, Mr. Ranyard has given what appears to be a pretty complete account of the known observations as to the presence of meteoric dust in the atmosphere. It appears that in the year 1852 Prof. Andrews found native iron in the basalt of the Giant's Causeway. Nordenskjöld found particles of iron which in all probability had a cosmic origin in the snows of Finland and in the ice-fields of the Arctic regions. Dr. T. L. Phipson, and more recently Tissandier, found similar particles deposited by the winds on plates exposed in different localities. Finally, Mr. John Murray discovered magnetic particles raised from deposits at the bottom of the sea by H.M.S. *Challenger*. These particles were examined by Prof. Alexander Herschel, who agreed with Mr. Murray in ascribing a cosmic origin to them. For fuller details and all references we must refer to Mr. Ranyard's paper. There cannot be any doubt that magnetic dust, which in all probability derives its origin from meteors, has often been observed, and the question arises, in what way we can increase our knowledge on these points to an appreciable extent. A further series of occasional observations would in all probability lead to no result of great value, unless they were carried on for a great length of time in suitable places. Meteoric dust, we know, does fall, and observations ought if possible to be directed rather towards an approximate estimate of the quantity which falls within a given time. Difficulties very likely will be found in the determination of the locality in which the observations should be conducted. The place ought to be sheltered as much as possible against any ordinary dust not of meteoric origin. The lonely spots best fitted for these observations are generally accessible to occasional experiments only, and do not lend themselves easily to a regular series of observations. Nevertheless experiments continued for a few months at some elevated spot in the Alps might lead to valuable results. The Committee would like to draw attention to an instrument which is well fitted for such observations. It was devised by Dr. Pierre Miquel for the purpose of examining, not the meteoric particles, but organic and organised matters floating about in the air. A description, with illustrations, will be found in the *Annuaire de Montsouris* for 1879. Two forms of the instrument are given. In the first form, which is only adapted to permanent places of observations, an aspirator draws a quantity of air through a fine hole. The air impinges on a plate coated with glycerine, which retains all solid matter. By means of this instrument we may determine the quantity of solid particles within a given volume of air. The second, more portable, form does not allow such an accurate quantitative air analysis. The instrument is attached to a weathercock, and thus is always directed against the wind, which traverses it, and deposits, as in the other permanent form, its solid matter on a glycerine plate. An anemometer placed in the vicinity serves to give an approximate idea of the quantity of air which has passed through the apparatus. These instruments have been called aëroscopes by their inventor. It is likely that the second form given to the apparatus will be best fitted for the purpose which the Committee has in view.

Seventh Report of the Committee on Underground Water Supply, consisting of Prof. E. Hull, the Rev. H. W. Crosskey, Capt. Douglas Galton, C.B., Mr. James Glaisher, F.R.S., Prof. G. A. Lebour, Mr. W. Molyneux, Mr. G. H. Morton, Mr. W. Pengelly, Prof. J. Prestwich, Mr. James Plant, Mr. James Parker, Mr. T. Roberts, Mr. S. Stooke, Mr. G. J. Symons, Mr. W. Whitaker, was read by Mr. C. E. de Rance, of H.M.'s Geological Survey, the Secretary.—The Committee was appointed in 1874 at the Belfast Meeting of the Association, with Prof. Hull, LL.D., F.R.S., as Chairman, and Mr. De Rance, F.G.S., as Secretary and Reporter; its six published reports occupy 125 pages of the Society's *Proceedings*, and the results of the investigations of the Committee show that the Permian, Triassic, and Jurassic formations of England and Wales are capable of absorbing from five to ten inches of annual rainfall, giving a daily average yield of from 200,000 to 400,000 gallons per square mile per day. The area occupied by these formations is, in round numbers, Permian and Trias, 8600 square miles, and Oolites, 6600 square miles, capable of yielding 1720 millions and 1320 million gallons respectively, at the lowest rate of absorption, or, united, a supply for 100 million people, at thirty gallons a head. Mr. De Rance then described the water-bearing condition of the Yorkshire area, and stated that the investigation would now be extended to all the porous rocks of South Britain.

Report on the Earthquakes of Japan, by Prof. John Milne.—The author arrives at the following conclusions:—1. That the actual back and forth motion of the ground is seldom more than a few millimetres (usually not equal to 1 m.m.), even though chimneys have fallen. 2. The motion usually commences gently, but is very irregular. 3. The number of vibrations per second usually vary between three and six. 4. During one shock *its direction* of motion may be irregular. 5. East and west vibrations, as recorded in Yedo, have in some cases been shown by time observations to have travelled up from the south. 6. Many of the shocks which visit Yedo appear to have come